CLAIMS

1. A catalyst for producing hydrogen gas from a mixed gas comprising dimethyl ether and water vapor or carbon dioxide gas, which comprises copper, iron, cobalt, palladium, iridium, platinum, rhodium, or nickel as an active component.

2. The catalyst as set forth in claim 1 wherein, the active component is copper or iron, the mixed gas comprises dimethyl ether and carbon dioxide gas, and the produced gas is synthetic gas.

3. The catalyst as set forth in claim 1 wherein, the active component is cobalt, palladium, iridium, platinum, rhodium or nickel, the mixed gas comprises dimethyl ether and water vapor, and the produced gas is synthesis gas.

4. The catalyst as set forth in claim 1 wherein, the active component is copper or iron, the mixed gas comprises dimethyl ether and water vapor, and the produced gas comprises hydrogen as a principal component.

5. The catalyst as set forth in claim 1 wherein, the active component is cobalt or palladium carried by a metal oxide having basicity, and the produced gas is synthesis gas.

6. The catalyst as set forth in claim 1 wherein, the active

component is platinum, the mixed gas comprises dimethyl ether and water vapor, and the produced gas is synthesis gas.

7. A method of producing hydrogen gas which comprises contacting a mixed gas comprising dimethyl ether and water vapor or carbon dioxide gas with a catalyst as set forth in claim 1.

8. A method of producing synthesis gas wherein, the mixed gas comprises dimethyl ether and carbon dioxide gas, and the catalyst is as set forth in claim 2.

9. A method of producing synthesis gas wherein, the mixed gas comprises dimethyl ether and water vapor, and the catalyst is as set forth in claim 3.

10. A method of producing water vapor wherein, the mixed gas comprises dimethyl ether and water vapor, and the catalyst is as set forth in claim 4.

11. A fuel cell using dimethyl ether as the fuel and a catalyst as set forth in claim 1.

12. A solid electrolyte-type fuel cell using a mixed gas comprising dimethyl ether and water vapor as fuel gas and a catalyst as set forth in claim 1.

13. As electricity generation method using dimethyl ether reformed gas which comprises reforming dimethyl ether to produce synthesis gas or hydrogen gas by adding water vapor or carbon dioxide gas to the dimethyl ether and catalyzing them using a catalyst as set forth in claim 1, and using the produced gas as a fuel for engine.

14. The electricity generation method as set forth in claim 13 which comprises reforming dimethyl ether utilizing medium, low temperature waste heat in the range of 200 to 500 ℃.

15. An electricity generating apparatus which comprises a reformer loaded with a catalyst as set forth in claim 1, a combustor for burning the synthesis gas or hydrogen gas, and an electricity generator having gas turbine rotated by the combustion exhaust gas generated in the combustor.

16. A method of manufacturing reduced iron which comprises reforming dimethyl ether to produce synthesis gas or hydrogen gas by adding water vapor or carbon dioxide gas to the dimethyl ether and catalyzing them using a catalyst as set froth in claim 1, and reducing iron are using the produced gas.

17. The method of manufacturing reduced iron as set forth in claim 16 wherein the reforming of dimethyl ether is carried out using an exhaust gas containing water vapor and carbon dioxide gas obtained by reducing the iron are.

18. The method of manufacturing reduced iron as set forth in claim 16 or 17 wherein sensible heat of the exhaust gas obtained by reducing the iron are is utilized as a heating source of the dimethyl ether reforming.

19. A manufacturing apparatus of reduced iron which comprises a reformer loaded with a catalyst as set forth in claim 1, and a reducing furnace loaded with iron ore, and the reducing furnace being connected with the reformer so that synthesis gas or hydrogen gas produced in the reformer is supplied to the reducing furnace.